

3.4 WETLANDS

This section characterizes existing wetlands on the site. Potential impacts to onsite wetlands from infrastructure development and full buildout under the Proposed Actions (Alternatives 1 and 2) and the No Action Alternative are also evaluated. This section is based on the February 2005, Wetland Assessment prepared by Raedeke Associates (see Appendix F).

3.4.1 Affected Environment

Wetland delineations and descriptions in this section are drawn from field investigations in 1999, 2001, 2003, and 2004; from information gathered and analyzed during previous studies of the site (2001); from maps and information from the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI, 1987, 1988), U.S.D.A. Soil Conservation Service (SCS) Soil Survey (1973), Washington Department of Natural Resources (WDNR) Forest Practice Base Map (2004), the King County Sensitive Areas Map Folio (1990), the King County Wetland Inventory (1991), and the City of Kent Wetland Inventory (2001); and from WDNR aerial photographs. Wetland delineations were based on guidelines from the U.S. Army Corps of Engineers (COE) Wetlands Delineation Manual (1987), as revised in the Washington State Wetlands Identification and Delineation Manual published by the Washington Department of Ecology (Ecology 1997). (See Section 3.3 of Appendix F for additional information on field survey and sampling techniques and on the wetland delineation process.)

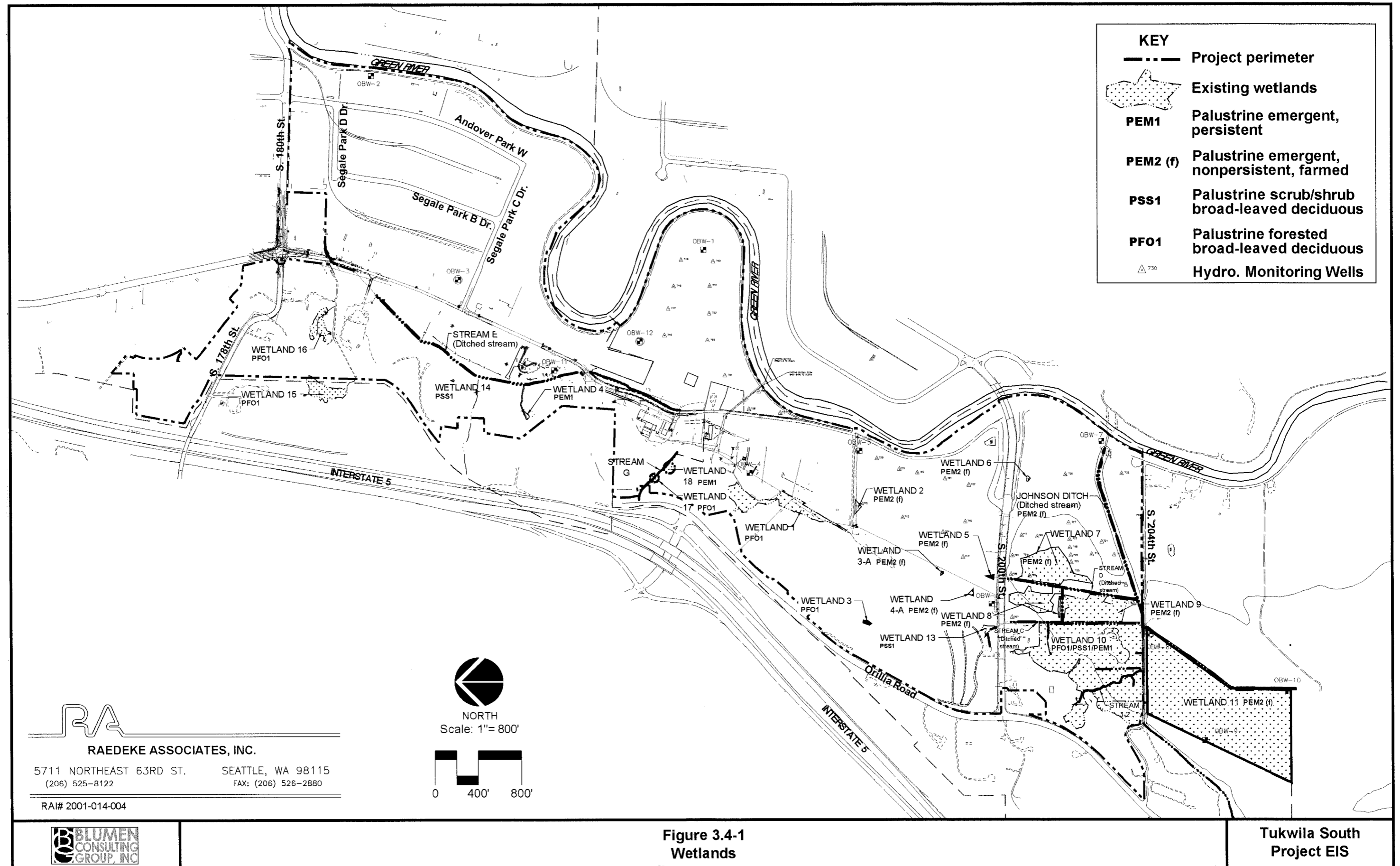
Field surveys included searching for areas with positive indicators of hydrophytic vegetation (wetland plants), hydric soils (wetland soils), and wetland hydrology (water supporting wetlands). A wetland hydrologic monitoring study was conducted in the winter and spring of 2003 and 2004 to determine whether portions of the agricultural fields on site met criteria to be considered wetland according to the COE Wetland Delineation Manual and the Washington State Wetlands Identification and Delineation Manual (see Section 2.0 of Appendix F for additional detail on the wetland delineation process).

Boundaries of the wetlands were confirmed by the COE and Ecology during site visits conducted in January and March 2005.

Wetland Descriptions

The site contains 19 wetlands totaling approximately 48.7 acres on site (some wetlands extend off site; see Figure 3.4-1 and Table 3.4-1), based on guidelines from the COE Wetlands Delineation Manual (1987), as revised in the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). No wetlands were identified in the agricultural fields east of Frager Road.

The delineated wetlands include a variety of vegetative cover types, although most include or are dominated either by forested cover or by agricultural crops. Many wetlands are small, and several are hydrologically isolated. Most wetlands that occur at the northern and southern ends of the site discharge to watercourses identified on site. Following are descriptions of the onsite wetlands (see Tables B.2 through B.25 in Appendix F for plant species found in these wetlands).



**Table 3.4-1
TUKWILA SOUTH WETLANDS**

Wetland	Delineation Methodology Acreage	Cowardin et al. (1992) Wetland Classification	Regulatory Type	Standard Minimum Buffer Width (ft.)
1	COE/WDOE - 2.11 ac.	PFO1	Tukwila Type 2	80
2	COE/WDOE - 0.09 ac.	PEM2(f)	Tukwila Type 3	50
3	COE/WDOE – 0.03 ac.	PFO1	Tukwila Type 3	50
3A	COE/WDOE – 0.01 ac.	PEM2(f)	Tukwila Un-classified	N/A
4	COE/WDOE – 0.04 ac.	PEM1	Tukwila Type 3	50
4A	COE/WDOE – 0.04 ac.	PEM2(f)	Tukwila Type 3	50
5	COE/WDOE – 0.02 ac.	PEM2(f)	Tukwila Un-classified	N/A
6	COE/WDOE – 0.03 ac.	PEM2(f)	Tukwila Type 3	50
7	COE/WDOE – 3.07 ac.	PEM2(f)	Tukwila Type 2	80
8	COE/WDOE – 1.5 ac.	PEM2(f)	Tukwila Type 2	80
9	COE/WDOE – 2.71 ac.	PEM2(f)	Tukwila Type 2	80
10	COE/WDOE – 16.38 ac.	PFO1/PSS1/PEM1	Tukwila Type 1	100
11	COE/WDOE – 21.70 ac.	PEM1	Kent Class 1	125
13	COE/WDOE – 0.11 ac.	PSS1	Tukwila Type 2	80
14	COE/WDOE – 0.01 ac.	PSS1	Tukwila Un-classified	N/A
15	COE/WDOE – 0.08 ac. ¹	PFO1	Tukwila Type 2	80
16	COE/WDOE – 0.65 ac.	PFO1	Tukwila Type 2	80
17	COE/WDOE – 0.05 ac. ²	PFO1	Tukwila Type 3	50
18	COE/WDOE – 0.10 ac. ²	PEM1	Tukwila Type 3	50

Source: Raedeke Associates, 2005.

¹ Total wetland area including off-site portion is estimated to be approximately 1.0 acres.

² Wetland was not surveyed. Area estimated based on field observations.

Notes:

COE = U.S. Army Corps of Engineers

WDOE = Washington State Department of Ecology

Per Cowardin et al. (1992) vegetation classes and subtypes onsite are defined as follows:

PFO = Palustrine (shallow, freshwater wetlands), forested (wetlands dominated by woody vegetation at least 20 feet tall), broad-leaved deciduous wetlands

PEM = Palustrine, emergent (wetlands dominated by erect, rooted, herbaceous vegetation) wetlands

PSS = Palustrine, scrub-shrub (wetlands dominated by woody vegetation less than 20 feet tall) wetlands

Emergent Wetlands

Eleven of the 19 delineated wetlands located within the site are palustrine, emergent (PEM) wetlands according to the USFWS wetland classification system. Of these, Wetlands 2, 3-A, 4-A, 5, 6, 7, 8, and 9 are located within agricultural fields in the southern portion of the site, are used for growing corn and are palustrine, emergent, non-persistent, farmed (PEM2(f); see Figure 3.4-1).

These wetlands are tilled and planted with corn during the spring; they are dominated by a nearly monotypic stand of corn (see Tables B.2 through B.9 of Appendix F for specific vegetation, soils, and hydrology data). All of these wetlands, except Wetland 2, flow seasonally to a series of watercourses that have been used historically to drain the agricultural fields to existing Johnson Ditch (a ditched stream). Wetland 2 is hydrologically isolated. These wetlands receive water primarily as direct rainfall or runoff from surrounding uplands; however, Wetlands 3-A and 4-A may also receive groundwater as a major source of hydrology.

Wetland 11, located on the south side of S 204th Street, is mowed during the summer for hay followed by tilling after the final mowing during the fall (see Figure 3.4-1). Wetland 11 receives water primarily as groundwater and direct precipitation. The wetland drains northward seasonally to a ditched stream along S 204th Street which connects to existing Johnson Ditch via a culvert.

Wetlands 4 and 18 are located within the forested slopes on the west side of the site and are dominated by emergent (herbaceous) cover (see Tables B.12 and B.13 of Appendix F and Figure 3.4-1). Wetlands 4 and 18 are palustrine, emergent, persistent (PEM1) wetlands according to the USFWS wetland classification system. The wetlands receive water primarily from seeps and runoff from the surrounding uplands. Wetland 4 flows seasonally to Stream E-1 located at the base of the forested slopes. Wetland 18 flows to a seasonal stream, Stream G, which terminates at a catch basin and pipe at the base of the slope.

Scrub-Shrub Wetlands

Wetlands 13 and 14 are palustrine, scrub-shrub, broad-leaved deciduous (PSS1) wetlands according to the USFWS wetland classification system. Wetland 13 is located adjacent to the north side of S 200th Street (see Figure 3.4-1). The wetland receives water from a pipe located at the north end of the wetland. Water in the wetland, when present, flows to a culvert beneath S 200th Street and into Ditch J-1.

Wetland 14 is located within the forested slopes on the west side of the site (see Figure 3.4-1). Wetland 14 receives water primarily from seeps and runoff from the surrounding uplands. Water in the wetland flows approximately 50 feet to the east to Stream E (a ditched stream).

Forested Wetlands

Wetlands 1, 3, 15, 16, and 17 are located within the forested portions of slopes on the west side of the site (see Figure 3.4-1). These wetlands are classified as palustrine, forested, broad-leaved deciduous (PFO1) wetlands according to the USFWS wetland classification system. All but Wetland 3, (which is hydrologically isolated with no surface outlet to other surface waters, and is situated within non-hydric soils outside the 100-year floodplain of the Green River) flow seasonally to ditched streams that are located at the base of the slope. Wetlands 1, 15, and 16

receive water from groundwater seepage, direct rainfall and runoff from surrounding uplands. Wetland 17 receives water primarily from a pipe that is located approximately 100 feet upstream. Wetland 3 receives water as direct rainfall and runoff from surrounding uplands.

Multiple Vegetation Class Wetlands

Wetland 10 is located in the southern portion of the site (see Figure 3.4-1). This wetland includes three vegetation classes and would be classified as a palustrine, forested, broad-leaved deciduous (PFO1), palustrine, scrub-shrub, broad-leaved deciduous (PSS1), and palustrine, emergent, persistent (PEM1) wetland according to the United States Fish and Wildlife Service (USFWS) wetland classification system (the largest vegetation class in Wetland 10 is emergent). Wetland 10 receives water primarily as groundwater from seeps at the base of slopes along the western edge of the wetland, as well as from a seasonally high water table. Direct precipitation and runoff from surrounding uplands also contribute to Wetland 10 hydrology. The wetland flows year-round through several ditched streams that partially drain the wetland to existing Johnson Ditch located on the north side of S 204th Street.

Wetland Functional Assessments

Wetland functions and values for the 19 delineated onsite wetlands were assessed using one of two methods. The first, Methods for Assessing Wetland Functions Volume I: Riverine and Depressional Wetlands in the Lowlands of Western Washington (WAFAM 1999), was used to evaluate all onsite wetlands except Wetlands 1, 4, 14 and 18. These four wetlands are classified as slope wetlands, and the WAFAM does not evaluate wetland functions within slope class wetlands. Therefore, the Washington State Department of Transportation (WSDOT 2000) Wetland Functions Characterization Tool for Linear Projects was used to assess functions for Wetlands 1, 4, 14 and 18 (see Section 3.4.1 of Appendix F for further information on the WAFAM wetland functions and values assessment).

WAFAM Assessment of Riverine and Depressional Wetlands

Wetland functions have been defined as the physical, chemical, and biological processes or attributes that contribute to the self-maintenance of wetland ecosystems. The WAFAM broadly divides these into water quality improvement functions, hydrologic (water quantity) functions, and habitat suitability functions. Functions related to water quality improvement include potential for removing sediment, nutrients, heavy metals and toxic organics. Hydrologic functions include potential for reducing peak flows and downstream erosion, and potential for recharging groundwater. Functions related to habitat suitability include general habitat; habitat for invertebrates, amphibians, anadromous fish, resident fish, wetland-associated birds, wetland-associated mammals; native plant richness; and, potential for primary production export.

The WAFAM is based on the presence of indicators (variables) that represent certain chemical or biological characteristics of a given wetland. These variables include the size of the wetland, its landscape setting, the degree of inundation and hydrologic regime, vegetation class interspersation, plant richness and the presence of snags or other large woody debris, among other variables. A wetland that has more of the appropriate variables performs a function better than one that has a few. Application of the WAFAM results in a set of indices, one for each function in each wetland unit being assessed. The indices generated by the WAFAM can be used to quantify total potential performance of a wetland for a specific function by multiplying the

size of the wetland by the functional index. Similarly, the index can be used to quantify wetland impacts and the degree of functional replacement that can be provided by wetland mitigation.

The WAFAM provides a framework for assessing wetland functional performance for wetlands within specific sub-classes only. Thus, a comparison of WAFAM assessments of functions for two wetlands that are within the “Depressional Closed” classification can be made, while comparisons between a “Depressional Closed” wetland and a “Closed Outflow” wetland cannot be made. In addition, the WAFAM provides assessments for individual functions. It does not provide a single summary performance index for the area being assessed. See Table 6 in Appendix F for the WAFAM index scores for each onsite wetland function for each wetland, and the calculated potential overall performance score for each function.

Water Quality Functions

Water quality functions include sediment removal, nutrient removal, and heavy metal and toxic organics removal. In general, the larger wetlands on the site, such as Wetlands 10 and 11, received the highest potential overall performance scores for all water quality functions for depressional outflow class wetlands, even though these wetlands were not given the highest index scores. Other wetlands that scored well for potential overall performance for water quality functions include Wetlands 7, 8, and 9. Wetlands that received moderate scores include Wetland 15 and 16. Wetlands that received low scores for potential overall performance include Wetland 3-A, 4-A, 5, 6, and 13. This was generally due to their small size rather than low index values for each function.

Wetlands 3-A, 4-A, 5, 6, 7, 8, 9, and 11 have the greatest opportunity to provide water quality functions, because they are located within or adjacent to agricultural fields that are tilled, fertilized, and treated with herbicides and pesticides on a yearly basis. Wetland 10 has a high level of opportunity to provide water quality functions due to ongoing grazing practices that occur within the wetland. Wetland 15 has a moderate opportunity to provide water quality functions, because it is partially surrounded by residential land use. Wetland 16 has a low opportunity to provide water quality functions, because most of its contributing watershed consists of forest. Refer to Appendix F for further detail.

Hydrologic Functions

Hydrologic functions include reduction of peak flows, downstream erosion, and groundwater recharge. Due to their large size, Wetlands 10 and 11 received the highest scores for potential overall performance for all water quality functions, even though these wetlands were not given the highest index scores. Other wetlands that scored well for overall potential performance include Wetlands 7, 8, and 9. Wetlands that received moderate scores include Wetlands 15 and 16. Wetlands that received low scores for potential overall performance of this group of functions include Wetlands 3-A, 4-A, 5, 6, and 13. These wetlands received low potential overall performance scores primarily due to their small size.

None of the depressional outflow wetlands are likely to have a great opportunity to provide reduction of peak flows and reduction of downstream erosion, because none of the wetlands are surrounded by urban land uses. However, all, with the exception of Wetland 10, would most likely have a moderate opportunity to reduce peak flows and reduce downstream erosion, because they are surrounded by agriculture and low density residential. Wetland 10 has a low opportunity to provide these two functions, because it is located in an undisturbed forest.

Several onsite wetlands, including Wetlands 3-A, 4-A, 10 and 11, receive groundwater as a major source of hydrology and thus have a low opportunity to provide recharge groundwater. All others are assumed to have a moderate to high opportunity to recharge groundwater, because they are situated in areas of relatively permeable soils.

Biological Functions

Biological functions include general habitat suitability; habitat for invertebrates, amphibians, anadromous fish, resident fish, wetland-associated birds, wetland-associated mammals; native plant richness; and primary production of organic material and its export. Wetlands 10 and 11 received the highest potential overall performance scores for nearly all biological functions. Wetland 10 also received the highest index scores for most biological functions. Despite its high potential overall performance scores, Wetland 11 received low to moderate index scores for most functions except primary production and export. Wetlands that received moderate scores include Wetlands 15 and 16. Wetlands 3-A, 4-A, 5, 6 and 13 received the lowest potential overall performance scores for all biological functions. Wetlands 6 and 13 received scores for potential suitability for anadromous and resident fish; however, it is not likely that these wetlands actually provided fish habitat due to the barriers created by culverts under S 200th Street and at existing Johnson Ditch (see the Section 3.3, Plants and Animals, including Fisheries, and Appendix E for further discussion of fish habitat and barriers).

WSDOT Wetland Assessment Tool - Slope Wetlands

The WSDOT (2000) functional assessment methodology for wetlands is based on best professional judgment. It is qualitative and does not quantify wetland functions as the WAFAM does. However, like the WAFAM, the WSDOT methodology evaluates whether a wetland has the potential to provide hydrologic functions (including certain water quality functions) and biological functions. Specifically, the WSDOT methodology evaluates whether a wetland has the potential to provide flood flow alteration; sediment removal; nutrient and toxicant removal; erosion control and shoreline stabilization; production of organic matter and its export; general habitat and its suitability; habitat for aquatic invertebrates, amphibians, wetland-associated mammals, wetland-associated birds, and fish; and native plant richness.

Wetland 1 is likely to provide most of the hydrologic and biological functions evaluated by the WSDOT methodology, because it is relatively large in size, and it includes a well developed forested vegetation class and an inundated area with a restricted outlet that remains ponded during several months in the summer. Wetland 1 has the potential to provide habitat for wetland-associated mammals due to the presence of permanent or semi-permanent inundation; however, generally the wetland is not likely to provide fish habitat due to the presence of a restricted outlet that blocks fish passage. Due to their small size, limited species diversity and absence of areas of inundation, Wetlands 4, 14 and 18 have the potential to provide only the production of organic matter and its export, and general habitat suitability functions.

See Table 7 in Appendix F for functional determinations of on-site slope wetlands.

Regulatory Considerations

Wetlands and streams are protected by Section 404 of the Federal Clean Water Act and other state and local policies and ordinances, including Washington Department of Ecology (Ecology), City of Tukwila (2004) and City of Kent (2004) Sensitive Areas Ordinance and Critical Areas

Regulations, (the most southern portion of the site is located in the City of Kent). Following is a brief description of U.S. Army Corps of Engineers (COE) and Ecology requirements under Section 404, and City of Tukwila and City of Kent regulatory considerations pertinent to onsite wetlands (see Appendix F for further information on regulatory considerations).

U.S. Army Corps of Engineers

Section 404 of the Clean Water Act generally prohibits the discharge of dredged or fill material into waters of the United States, including certain wetlands and streams, without a permit from the U.S. Army Corps of Engineers (COE 2002). In general, alterations of more than 0.50 acres of wetland require an Individual Permit from the COE. In order for the COE to authorize an Individual Permit, the applicant must demonstrate that: (1) there is not a practicable alternative to the proposed activity, which would have less adverse impacts on the aquatic ecosystem, and (2) the benefits of the proposed wetland alteration outweigh the damage to the wetland resource. The COE makes the final determination as to whether an area meets the definition of a wetland as defined by the federal government. In general, compensatory mitigation for wetland impacts is required by the COE according to the specific requirements of the local or state jurisdiction.

Washington Department of Ecology

In the state of Washington, before proceeding with work under a COE-authorized permit, Section 401 of the Clean Water Act requires that the permit applicant receive a Water Quality Certification/Coastal Zone Management Consistency Response from the Washington Department of Ecology. This certification verifies that the proposed action complies with all provisions of the federal Clean Water Act, state water quality laws, and any other appropriate state laws (such as the Hydraulic Code).

City of Tukwila

The Tukwila (2004) Sensitive Areas Ordinance (TMC 18.45) regulates wetlands and streams as sensitive areas. Alterations of wetlands or streams and their buffers are generally prohibited, except as allowed under certain conditions specified in the ordinance. Under TMC 18.45.080, Wetlands are rated as Type 1, 2, or 3, based on characteristics, such as size, number and type of vegetative cover types (i.e., habitat complexity), and presence (or absence) of endangered or threatened species. Type 1, 2 and 3 wetlands are provided 100, 80 and 50-foot buffers, respectively, plus a 15-foot building setback.

Under TMC 18.45.080, Wetland 10 would be regulated as Type 1 because it is greater than 5 acres in size and includes three vegetation classes. Wetlands 1, 7, 8, 9, 13, 15 and 16 would be regulated as Type 2 because they are hydrologically connected to Type 2 streams. Wetlands 2, 3, 4, 4A, 6, 17 and 18 would be regulated as Type 3 because they are greater than 1,000 square feet in size and include two or fewer vegetation classes. Wetlands 3-A, 5, and 14 are not classified under TMC 18.45.080, because they are less than 1,000 square feet in size and do not otherwise meet criteria to be Type 1, Type 2 or Type 3 wetlands. See Table 3.4-1 for a listing of the onsite wetlands and associated regulatory classes.

Under TMC 18.45.160, the City Council may designate certain areas as Sensitive Area Master Plan Overlay (SAMPO) districts for the purpose of allowing and encouraging a comprehensive approach to sensitive area protection and mitigation for impacts to sensitive areas. Within a

SAMPO district, an applicant may provide an alternative to the standard code requirements for the preservation of existing individual wetlands and their buffers in situations where a master plan for alteration and mitigation would result in improvement to water quality, fish and wildlife habitat and hydrology beyond those that would occur through the strict application of the provisions of TMC 18.45 (see Appendix L for a description of the Sensitive Area Master Plan proposed for the site and Chapter 2 for a summary of the plan).

City of Kent

The City of Kent (2004) regulates wetlands and streams as sensitive areas under the Critical Areas Regulations (CAR). Under the City of Kent CAR (2004), wetlands are rated as Category 1, 2, or 3 based on characteristics such as size, number and type of vegetative cover types (i.e., habitat complexity), and presence (or absence) of endangered or threatened species. The CAR typically requires that undisturbed buffers of 125, 75, and 50 feet, plus a 15-foot building setback, be provided around the outer perimeter of Category 1, 2, and 3 wetlands, respectively. Most activities, such as removing, excavating, disturbing or dredging soil, discharge of fill, or any activity potentially affecting a wetland or its buffer, are regulated under the City of Kent CAR (2004).

Wetland 11 is located within the City of Kent and is designated as Category 1 in the City of Kent (2001) Wetland Inventory because it is described as “unique and fragile.”

3.4.2 Impacts

Alternatives 1 and 2

Infrastructure Development Phase

Direct Impacts

Infrastructure development on the Tukwila South site under Alternatives 1 and 2 would result in direct impacts to wetlands. Roadway improvements necessary to access the site, relocation of the flood protection barrier dike, and land clearing and grading would fill or alter existing wetlands on site.

Direct impacts to wetlands from infrastructure development would be the same for Alternatives 1 and 2. Under Alternatives 1 and 2, a total of 9.45 acres of wetlands would be filled, out of a total of 48.68 acres of existing wetland area on the Tukwila South site. Of the 9.45 acres of wetlands that would be affected by the proposed infrastructure development, 0.03 acres are isolated closed depression wetlands; the remaining are adjacent wetlands (see Table 3.4-2 for details on wetland alteration). A total of 7.53 acres of wetlands to be filled are degraded agricultural fields that are annually tilled and planted with corn. The balance of the wetland area to be altered is comprised of palustrine emergent, scrub-shrub, or forested wetlands occurring on the western hillside. See Figure 3.3-2 for a depiction of the wetland fill.

**Table 3.4-2
PROPOSED WETLAND IMPACTS ON THE TUKWILA SOUTH SITE**

Wetland	Wetland Acreage	Cowardin et al. (1992) Wetland Classification	HGM Classification	Proposed Impact (ac)	Impact Rationale	Regulatory Type
1	2.11 ac.	PFO1	DO/Slope	0.26	Southcenter Parkway	Tukwila Type 2
2	0.09 ac.	PEM2(f)	DC	0.09	Site Grade	Tukwila Type 3
3	0.03 ac.	PFO1	DC	0.03	Site Grade	Tukwila Type 3
3A	0.01 ac.	PEM2(f)	DO	0.01	Site Grade	Tukwila Un-classified
4	0.04 ac.	PEM1	DC	0.00	No impact	Tukwila Type 3
4A	0.04 ac.	PEM2(f)	DO	0.04	Site Grade	Tukwila Type 3
5	0.02 ac.	PEM2(f)	DO	0.02	Site grade	Tukwila Un-classified
6	0.03 ac.	PEM2(f)	DO	0.03	Site Grade	Tukwila Type 3
7	3.07 ac.	PEM2(f)	DO	3.07	Site Grade	Tukwila Type 2
8	1.5 ac.	PEM2(f)	DO	1.5	Construct Dike, Storm Pond	Tukwila Type 2
9	2.71 ac.	PEM2(f)	DO	2.71	Construct Dike, Storm Pond	Tukwila Type 2
10	16.38ac.	PFO1/PSS1/ PEM1	DO	0.91	Construct Dike & Site Grade	Tukwila Type 1
				10.73	Mitigation	
11	21.70 ac.	PEM1	DO	21.70	Mitigation	Kent Class 1 ¹
13	0.11 ac.	PSS1	DO	0.11	Site Grade	Tukwila Type 2
14	0.01 ac.	PSS1	Slope	0.00	No impact	Tukwila Un-classified
15	0.08 ac.	PFO1	DO	0.00	No impact	Tukwila Type 2
16	0.65 ac.	PFO1	DO	0.65	Site Grade, Storm pond	Tukwila Type 2
17	0.05 ac.	PFO1	RF	0.00	No impact	Tukwila Type 3
18	0.10 ac.	PEM1	Slope	0.00	No impact	Tukwila Type 3

Source: Raedeke Associates, 2005.

¹ Wetland 11 is classified as Class 1 in the City of Kent Inventory. However, physical characteristics would result in a Class 2 rating.

Wetland fills would result from a variety of activities under Alternatives 1 and 2. Road construction of the expanded Southcenter Parkway would result in fill of a portion of Wetland 1 and Stream E. A total of 0.26 acres of Wetland 1 would be filled for road construction.

Construction of the relocated flood protection barrier dike and stormwater facilities in the southern portion of the site would require filling of Wetlands 8, 9, as well as a portion of Wetland 10. Approximately 5.1 acres of wetland area would be directly affected by construction of the relocated dike and stormwater facilities. Clearing and grading of the site to establish suitable site grades would result in direct impacts to thirteen (13) wetlands on the site. Clearing and grading would fill all of Wetlands 2, 3, 3a, 4a, 5, 6, 7, 13 and 16, for an overall total of just over 4 acres. (See Table 3.4-2 for details on wetland alteration.)

Dewatering would need to occur to accomplish construction of the south stormwater ponds (temporary and permanent), the new Johnson Creek corridor, and to some extent for excavation in the Green River off channel Habitat Restoration Area (refer to Section 3.2, Water Resources, of this Draft EIS for further detail on dewatering). Dewatering could temporarily affect Wetlands 10 and 11 on the site. Water tables in the vicinity of these infrastructure and mitigation features would be pumped lower to allow for excavation. Water tables within 100 feet of the construction sites would be lowered while the pumping occurs. Lowering of the water table has the potential to alter the plant communities in Wetlands 10 and 11 during the course of construction. However, a portion of Wetland 10 and all of Wetland 11 would also be cleared and graded concurrently with the lowering of the water table in order to provide suitable wetland mitigation area (see Mitigation Measures below). It is not anticipated that the temporary lowering of the water table near Wetlands 10 and 11 would result in a significant adverse impact, because the water table is expected to return to its pre-development condition after dewatering operations cease.

Infrastructure development under Alternatives 1 and 2 also has the potential to have direct impacts on wetland buffers on the site. Clearing, grading, and road construction would result in the removal of buffer area around certain wetlands; portions of the buffers areas around Wetlands 1, 10 and 15 would be lost as a result of site development. Buffers around Wetlands 11, 14, 17 and 18 would not be altered.

In addition to wetland impacts, onsite agricultural ditches and ditched streams would be filled to accommodate site development. A discussion of the ditches and ditched streams to be filled, including their classification under the Tukwila Municipal Code and the impacted area, is contained in Section 3.3, Plants and Animals, of this Draft EIS and Appendix E.

Under Alternatives 1 and 2, approximately 80 percent of onsite wetlands (39.23 acres) would be preserved. Functional buffers would be provided around all of the retained wetlands on site.

The Tukwila Code requires compensatory mitigation at a ratio of 3:1 for wetland impacts. The elimination of 9.45 acres of existing wetland would require the establishment of at least 28.35 acres of compensatory wetland mitigation. Ecology guidelines would require a minimum of 20 acres of wetland mitigation for the elimination of 9.45 acres. The overall goal of the proposed compensatory mitigation would be to rehabilitate, create and enhance wetland habitat in the southwestern portion of the Tukwila South site. To accomplish this, 32.43 acres of existing degraded agricultural wetlands (Wetland 11 and the retained, degraded portions of Wetland 10) would be rehabilitated to provide habitat features and hydrologic regimes that would replace the wetland functions lost through the filling of other wetland habitats on the site. The plan would

rehabilitate 21.7 acres of palustrine forested wetland, 6.36 acres of palustrine emergent wetland, and 3.56 acres of palustrine scrub-shrub wetland. In addition, the wetland rehabilitation plan would create 0.05 acres of new forested wetland in existing upland area and enhance 0.76 acres of palustrine scrub-shrub wetland that has been degraded by livestock grazing activities (see Figure 3.4-2 for a depiction of the proposed wetland rehabilitation plan).

Woody (shrub) cover would be added to the perimeter of the wetland mitigation area to establish buffers and to increase their functioning as vegetative screening and wildlife cover.

The vegetation communities proposed for the compensatory mitigation area are intended to mimic the riparian, floodplain wetlands that likely existed on the site prior to the diking of the river and the use of the site as agricultural land. These vegetation communities, and their altered hydrologic regimes, are intended to provide greater wetland functions for water quality improvement, nutrient removal, support of food chain, and sediment removal than under existing conditions. The proposed rehabilitation of wetlands proposed under Alternatives 1 and 2 is further described in Appendix F.

Indirect Impacts

Infrastructure development under both Alternatives 1 and 2 could also result in indirect impacts to wetland habitats on site, as described below.

Erosion/Sedimentation and Water Quality Impacts

Without appropriate erosion and sediment controls, wetlands downslope or downstream of construction could be affected during infrastructure development. Proposed installation of sediment and erosion control features, as well as the implementation of best management practices during construction, would help avoid or minimize these potential impacts on wetland habitats. With implementation of the proposed mitigation measures, significant erosion or sedimentation impacts during construction would not be expected. (See Section 3.2, Water Resources, and Appendices B and C for a description of the proposed stormwater control system and Section 3.1, Earth, and Appendix A for a description of the proposed erosion and sedimentation control mitigation measures.)

Wetland buffers potentially affected by infrastructure development include buffers to Wetlands 1 and 10. Increased sedimentation and pollutant loading could occur to Wetlands 1 and 10 during construction. Proposed erosion and sedimentation control measures and water quality treatment would prevent such potential impacts (see Section 3.2, Water Resources, and Appendix C for a detailed discussion of water quality and proposed water quality treatment).

Habitat Impacts

Wetlands and their associated buffers can provide important nesting, resting, and feeding habitat for a wide variety of wildlife species. The loss of these habitats could reduce the habitat available for wildlife. The proposed development would eliminate 9.45 acres of wetland habitat, a net decrease in total wetland habitat on the site. The majority of the habitat loss (7.53 acres of agricultural wetlands) would reduce available forage habitat for winter waterfowl; however, much of this wetland area currently has little habitat value and is within the Federal Aviation Administration (FAA) hazard zone around Seattle-Tacoma International Airport, in which land



uses with the potential to attract wildlife hazardous to air traffic (such as geese or similar large birds) are discouraged. See the Section 3.3, Plants and Animals, and Appendix D for further discussion of impacts to wildlife habitat.

Full Buildout

Direct Impacts

Because the majority of site preparation would occur during the infrastructure development phase, no additional direct impacts to wetlands would be anticipated during full buildout of Alternatives 1 and 2. Indirect impacts, as described above, could occur during full buildout; however, with implementation of the proposed mitigation measures, adverse impacts to wetlands would not be expected.

As described above, approximately 39.23 acres, or 80 percent, of onsite wetlands would be preserved under Alternatives 1 and 2.

Indirect Impacts

Proposed development of the Tukwila South site under both Alternatives 1 and 2 could also result in indirect impacts to wetland habitats on site. Removal of existing vegetation, and ultimately, conversion to a mix of uses would result in changes in hydrologic patterns that could affect the volume or timing of water reaching the wetlands, thereby affecting wetland plant communities and wildlife habitat. New sources of pollution via increased vehicles on site could result in degradation of water quality within the wetlands.

Potential indirect wetland impacts (hydrology and water quality) would be similar under Alternatives 1 and 2. While development of the site under Alternative 2 would result in less building space than under Alternative 1, this EIS analysis assumes that development under both alternatives would result in essentially the same amount of impervious surface area; therefore, impacts to wetlands are assumed to be the same under both of these alternatives (refer to Section 3.2, Water Resources, for further detail on impervious area assumptions).

Hydrologic Impacts

Future building and onsite road development over the 22-year buildout period would result in an increase in impervious surfaces, as well as alterations to existing surface and sub-surface flows onsite. Increased runoff from impervious surfaces has the potential to increase water level fluctuations within wetlands, as well as reduce infiltration and groundwater recharge. Changes to existing surface and subsurface flows also could affect hydrology within the wetlands.

Once the permanent stormwater system is in place (proposed to occur in the infrastructure development phase, years 2 and 3), runoff from impervious surfaces on site, including from roadways that would be built during the infrastructure development phase, would be routed to these facilities. No stormwater would be discharged to retained wetlands on site. Installation and maintenance of permanent stormwater control features would eliminate the potential for water level fluctuations to affect wetlands (see Appendices A and C, and Sections 3.1, Earth, and 3.2, Water Resources, for further information).

Almost all of the retained wetlands on site are located upgradient of the proposed development areas, south of the new flood barrier dike, or at the base of the forested hillside; therefore, the increase in impervious surfaces below the water catchment area of the wetlands would not impact the retained wetlands. One retained wetland, located downstream of the proposed development area (the majority of Wetland 10), receives the majority of its hydrologic inputs from portions of the site that are not proposed for development. Therefore, it is anticipated that the retained Wetland 10 would not be significantly affected by development under Alternatives 1 and 2 (see Appendices A and C, and Sections 3.1, Earth, and 3.2, Water Resources, for further information).

Erosion/Sedimentation and Water Quality Impacts

Runoff from onsite streets, roads, and parking areas could increase the contaminant loading to retained wetlands, potentially overcoming their ability to filter out contaminants. Increased contaminant loading could also affect existing vegetation communities and wildlife use of the wetlands. Runoff from these new surfaces could carry pollutants to the retained portions of Wetlands 1, 10 and 15, resulting in degradation of water quality. However, the proposed collection and water quality treatment of runoff from onsite roads and parking areas would eliminate potential water quality impacts to wetlands. (See Section 3.2, Water Resources, and Appendix C for a description of the proposed water quality treatment system.)

Indirect/Cumulative

Proposed development of the Tukwila South site under Alternatives 1 and 2 would result in the fill and loss of 9.45 acres of wetland habitat. The loss of this wetland area could reduce the overall wildlife use in the area as well as reduce the available habitat in the region. The proposed compensatory mitigation would result in an overall increase in wetland functions in the site area. However, the project would result in a net loss of wetland area in the region.

No Action Alternative

No direct alterations to wetlands would be assumed under the No Action Alternative. The No Action Alternative would not include the relocation of the flood barrier dike in the southern portion of the site, nor would it result in direct alteration of wetlands from road construction or site grading. Road construction necessary to extend Southcenter Parkway to an intersection with S 200th Street would cross Stream E at one location. This crossing would result in the loss of 327 linear feet of Stream E (refer to Section 3.3, Plants and Animals, for further discussion of impacts to Stream E).

No buildings would be constructed south of the existing flood barrier dike, and there would be no alteration to the over 7 acres of agricultural wetlands in southern portion of the site. Wetlands on the site that are currently in agricultural use would remain in agricultural use.

Indirect impacts to wetlands could occur under the No Action Alternative, similar to those described for Alternatives 1 and 2, and could include hydrologic and erosion/sedimentation and water quality impacts. However, new development would be expected to follow applicable stormwater regulations, and significant indirect impacts to wetlands would not be expected.

3.4.3 Mitigation Measures

- Proposed development would occur under the guidelines of the proposed Sensitive Area Master Plan for the site, prepared in accordance with Sensitive Area Master Plan guidelines set forth in TMC 18.45.160 (see Appendix L for the plan and Chapter 2 for a brief summary of the plan).
- The proposed Tukwila South project would incorporate a number of features that would minimize or limit impacts to the wetlands and their buffers, including:
 - Retaining the majority (80 percent) of the existing wetland habitat and wetland buffers onsite;
 - Providing functional buffers around all of the retained wetlands on site;
 - Clearly marking the limits of wetland buffers or setbacks prior to construction activities to prevent inadvertent or unnecessary encroachment;
 - Installing and maintaining temporary and permanent soil erosion control measures specifically for Wetlands 1, 10 and 11 during and after construction, consistent with Best Management Practices, as required by the City of Tukwila to limit the potential for sediment deposition or erosion in the retained wetlands and their buffers; and,
 - Routing stormwater runoff from the proposed development areas through stormwater detention and water quality facilities prior to discharge to limit potential for sediment deposition and provide the required water quality treatment.
- The conceptual wetland mitigation plan proposed to compensate for wetland impacts resulting from the Tukwila South project would rehabilitate, create and enhance 32.43 acres of functionally significant wetlands on the site. The proposed mitigation acreage would exceed the amount required by City of Tukwila regulations (3:1 ratio or 28.35 acres would be required), and Washington Department of Ecology guidelines (20 acres would be required as part of the mitigation plan; see Appendix F for details on the conceptual mitigation plan).
 - Wetland 11 and the retained, degraded portions of Wetland 10 would be rehabilitated to provide habitat features and hydrologic regimes that would be intended to replace the wetland functions lost through the filling of other wetland habitats on the site.
 - The wetland rehabilitation area would be planted to develop palustrine forested, scrub-shrub and emergent cover types, in a mixture intended to compensate for the areas filled.
 - The vegetation community in the wetland rehabilitation area would be designed to not attract waterfowl in response to the Federal Aviation Administration guidelines to limit or reduce potential for bird aircraft conflicts within 10,000 feet of aircraft runways (in particular, the runways of the Seattle-Tacoma International Airport).
 - Upon approval of the wetland mitigation plan, a final planting plan and construction specifications would be prepared in conjunction with a landscape architect. The final

planting plan would specify such items as: (1) plant species, quantities, and sizes, (2) planting locations, (3) general notes, (4) planting details, (5) construction timing, (6) protection of existing vegetation, (7) source of plant material, (8) soil amendments, (9) watering, and (10) maintenance.

- The compensatory wetland rehabilitation plan would include a systematic monitoring program to assess the success of the effort. The monitoring program would include construction, compliance, and long-term monitoring. The results of the monitoring would be used to develop any needed modifications or alterations of the wetland rehabilitation site in subsequent years.
- Existing Johnson Ditch would be realigned and placed into a new channel along the south side of the proposed relocated flood barrier dike, creating some new wetland habitat (approximately 1.5 acres).
- Some new wetland habitat (approximately 1.45 acres) would be created in conjunction with the Green River Off Channel Habitat Restoration Area (see Section 3.3, Plants and Animals, and Appendix E for detail).

3.4.4 Significant Unavoidable Adverse Impacts

Proposed development of the Tukwila South site under Alternatives 1 and 2 would result in the fill and loss of 9.45 acres of wetland habitat. The loss of this wetland area could reduce the overall wildlife use in the area as well as reduce the available habitat in the region. The proposed compensatory mitigation would result in an overall increase in wetland functions in the project area. However, the project would result in a net loss of wetland area in the region.